CODE LETTERS FOR PROGRESS REPORT 93

CONTINUOUS EVALUATION OF CORRUGATING MEDIUM, FEBRUARY 1, 1962

Company - Mill	Machine No.	Code Letter
The Chesapeake Corporation--West Point	1	--
Continental Can Company, Inc.--Hopewell	1	K
--Hodge	1	V
Crown Zellerbach Corporation--Baltimore	1	I
--Baltimore	2	D
--Bogalusa	4	--
--Lebanon	2	P
International Paper Company--Arecibo	F	G
--Bastrop	1	O
--Bastrop	2	B
--Georgetown	1	S
The Mead Corporation--Harriman	1	F
--Knoxville	1	U
--Lynchburg	2	J
--Sylva	1	--
St. Regis Container Corporation Mill Division--Coshocton	1	A
North Carolina Pulp Company--Plymouth Weyerhaeuser Company, North Carolina Div.	3	L
Olin Mathieson Chemical Corporation--Monroe	1	--
--Monroe	2	--
Owens-Illinois Glass Company--Tomahawk	1	C
--Tomahawk	2	R
--Tomahawk	3	N
--Big Island	3	H
St. Joe Paper Company--Port St. Joe	1	E
Union Bag-Camp Paper Corporation--Savannah	2	M
West Virginia Pulp and Paper Company--Covington	6	Q
--Covington	7	--
--Charleston	--	--
Packaging Corporation of America--Filer City	1	W
--Filer City	2	T

THE INSTITUTE OF PAPER CHEMISTRY

Appleton, Wisconsin

CONTINUOUS EVALUATION OF CORRUGATING MEDIUM

Project 1108-17

Report 93

A Progress Report

to

FOURDRINIER KRAFT BOARD INSTITUTE, INC.

February 1, 1962

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THE INSTITUTE OF PAPER CHEMISTRY

Appleton, Wisconsin

CONTINUOUS EVALUATION OF CORRUGATING MEDIUM

INTRODUCTION

As requested by the Technical Committee of the Fourdrinier Kraft Board Institute, Inc., the reports pertinent to the continuous evaluation of corrugating medium are now being prepared by The Institute of Paper Chemistry on a bimonthly basis instead of the previous monthly basis. This new system was initiated on August 1, 1961. This third report under the new system presents results obtained during the months of December, 1961, and January, 1962. In the two previous reports prepared on the bimonthly basis, the results for the two months covered by the respective reports were summarized for each month on an individual basis; that is, test averages were presented for each month. In the present report, at the request of the Technical Committee, the test averages are based on combined data for the two months covered by the report.

During this third bimonthly period, 150 rolls of corrugating medium representing the production of twenty-three machines were evaluated. A tabulation of the number of rolls submitted from each machine during the months of December, 1961, and January, 1962, is given in Table I. In connection with the data given in Table I, it should be mentioned that, effective September 1, 1961, at the request of the Technical Committee, the limit on the number of rolls submitted for evaluation from each machine during a given month was reduced from six to four.

Each sample of corrugating medium was evaluated for basis weight, caliper, Concora flat crush (conditioned after fluting), H. and D. flat crush on single-faced board, and runnability. Runnability was measured by corrugating each roll under standardized conditions on the Institute's corrugator into A-flute board at 600 feet per minute with minimum tension. If unsatisfactory runnability occurred

TABLE I

NUMBER OF ROLLS OF CORRUGATING MEDIUM SUBMITTED
FOR EVALUATION FROM EACH MACHINE

December, 1961, and January, 1962

Machine Code	Number of Rolls
A	2
B	5
C	8
D	8
E	6
F	8
G	9[a]
H	12[a]
I	8
J	8
K	8
L	8
M	8
N	7
O	4
P	8
Q	8
R	8
S	3
T	3
U	4
V	4
W	3
Total	150

[a] Some of these rolls arrived too late for inclusion in the previous report.

at this speed, the corrugator was slowed down in increments of 25 f.p.m. until satisfactory runnability was obtained--i.e., no ruptured flutes. If the medium fabricated satisfactorily at 600 f.p.m. with minimum tension, further runs were made at higher tensions to determine when cracking occurred. The higher tensions used were 0.5 lb. per inch, 1.0 lb. per inch, and 1.5 lb. per inch.

Flat crush was determined on the single-faced board obtained at a speed of 600 f.p.m. with minimum tension. The flat crush results, in addition to supplying information about quality, will provide data which may be useful in studying the relationship between Concora flat crush and combined board flat crush for each participant's medium.

The average test results obtained on the rolls of corrugating medium submitted by each participant during December, 1961, and January, 1962 (current machine average) are shown in Table II and graphically presented in Fig. 1 to 4. In addition to a comparison of the test data obtained for the various machines, Table II also presents the current F.K.I. averages, cumulative F.K.I. averages, and the F.K.I. indexes. The current F.K.I. average is the average of test results for all machines participating in the study during a given period. The cumulative F.K.I. average is based on the results for the previous twelve-month period excluding the result for the current period. The F.K.I. index is obtained as follows:

$$\frac{\text{current F.K.I. average}}{\text{cumulative F.K.I. average}} \times 100 = \text{F.K.I. index (\%)}$$

The F.K.I. index provides a ready means of comparing the current quality with previous results. An index greater than 100% indicates that current quality is higher than the average result for the previous twelve periods; an index below 100% indicates that current quality is lower than the average result for the previous twelve periods.

TABLE II

SUMMARY OF CURRENT MACHINE AVERAGES

December, 1961 and January, 1962

Mill Code	Basis Weight, lb.	Caliper, points	Concora Flat Crush, p.s.i.	Single-Face Flat Crush, p.s.i.
A	29.3	10.6	38.5	31.6
B	26.6	10.7	39.1	35.1
C	27.0	10.2	38.4	34.6
D	28.2	10.0	34.6	30.5
E	28.7	9.4	35.0	31.0
F	28.4	11.4	34.5	30.0
G	27.5	9.5	32.9	32.2
H	26.9	10.4	37.4	34.4
I	28.9	10.0	39.0	32.8
J	27.1	10.1	37.4	31.8
K	28.3	10.9	39.4	36.0
L	26.7	9.5	36.5	33.8
M	26.8	8.9	35.7	31.5
N	27.8	10.1	37.1	33.2
O	27.2	11.0	41.1	37.8
P	26.7	10.1	32.3	30.1
Q	26.9	10.5	34.6	31.1
R	26.7	10.1	37.9	33.5
S	27.4	10.1	38.6	34.8
T	26.4	9.5	37.0	32.5
U	26.9	11.0	36.2	33.4
V	27.0	10.1	40.1	35.3
W	25.9	10.0	32.8	29.9
Current F.K.I. Average	27.4	10.2	36.8	32.9
Cumulative F.K.I. Average	27.3	10.3	36.4	33.3
F.K.I. Index, %	100.2	99.2	101.1	98.8

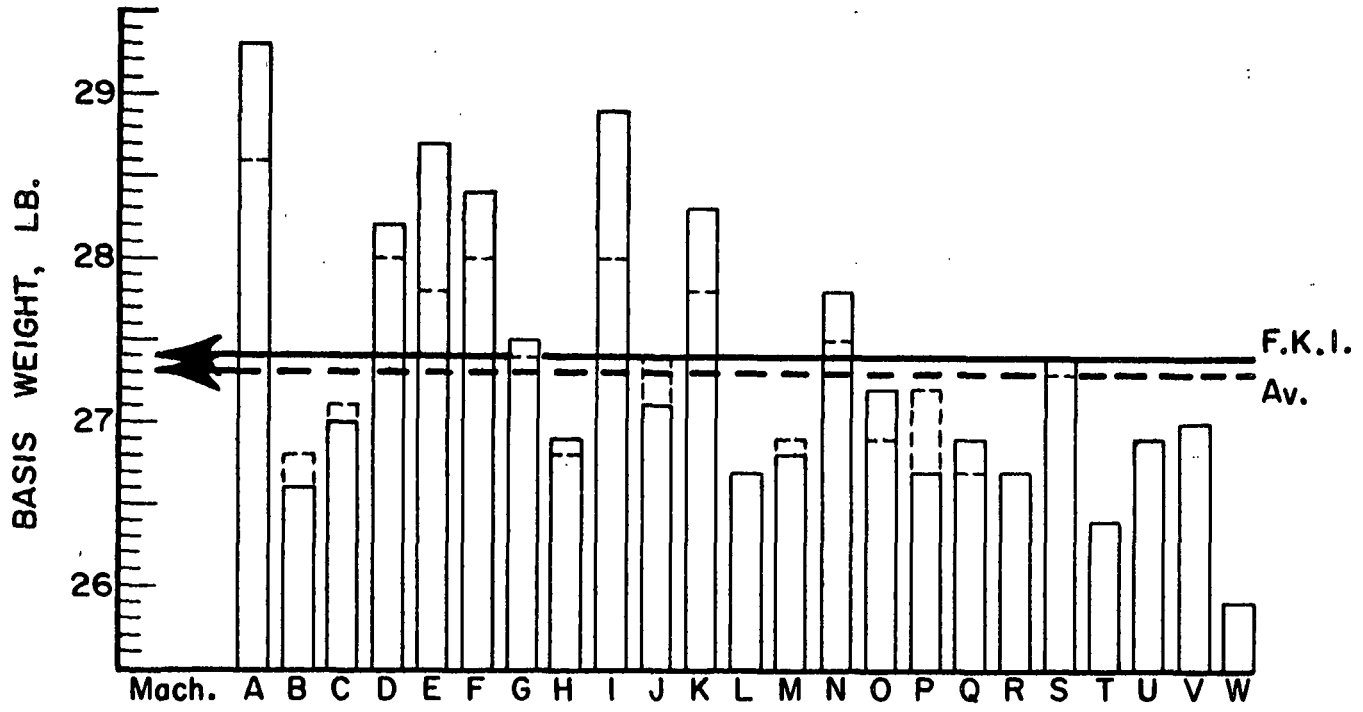

Figure 1. Comparison of Basis Weight Results

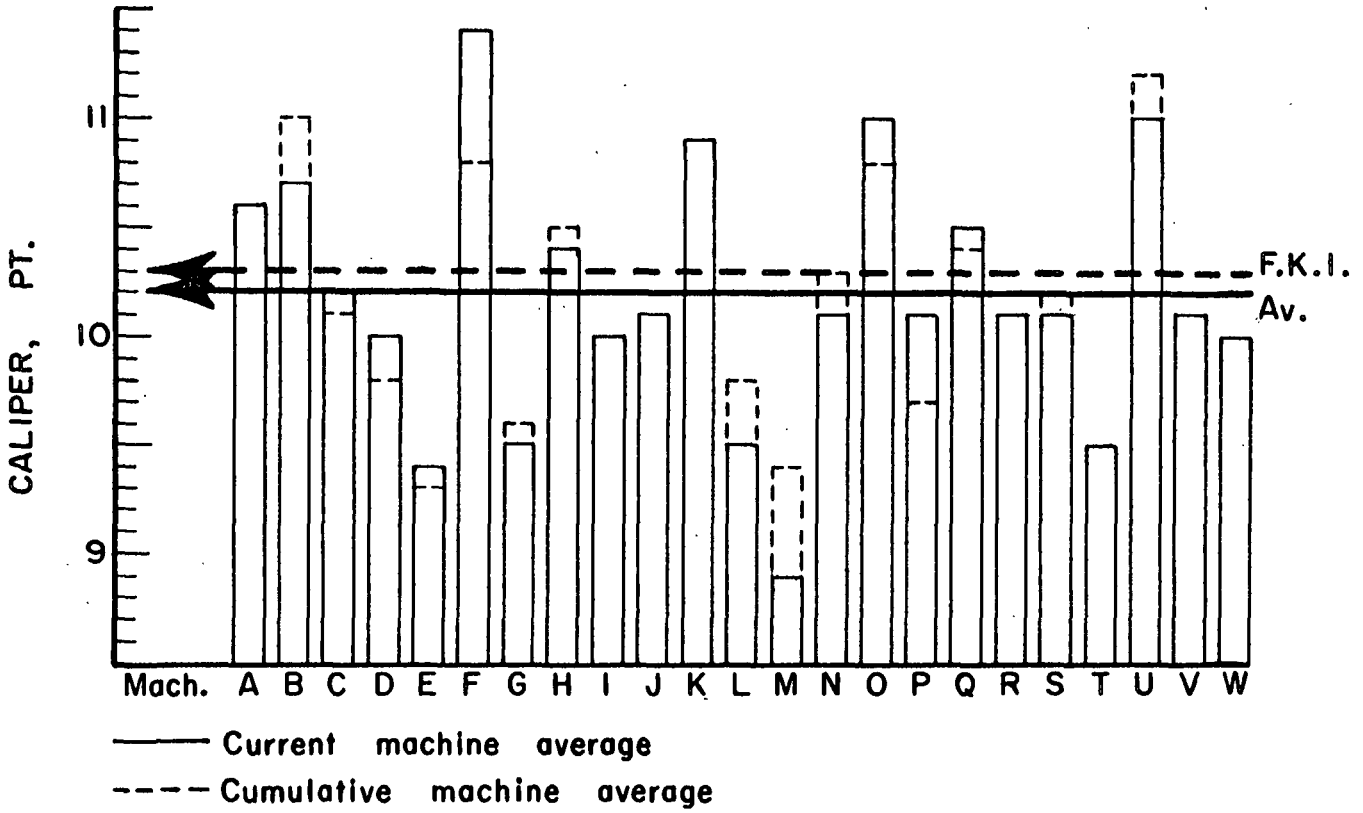

Figure 2. Comparison of Caliper Results

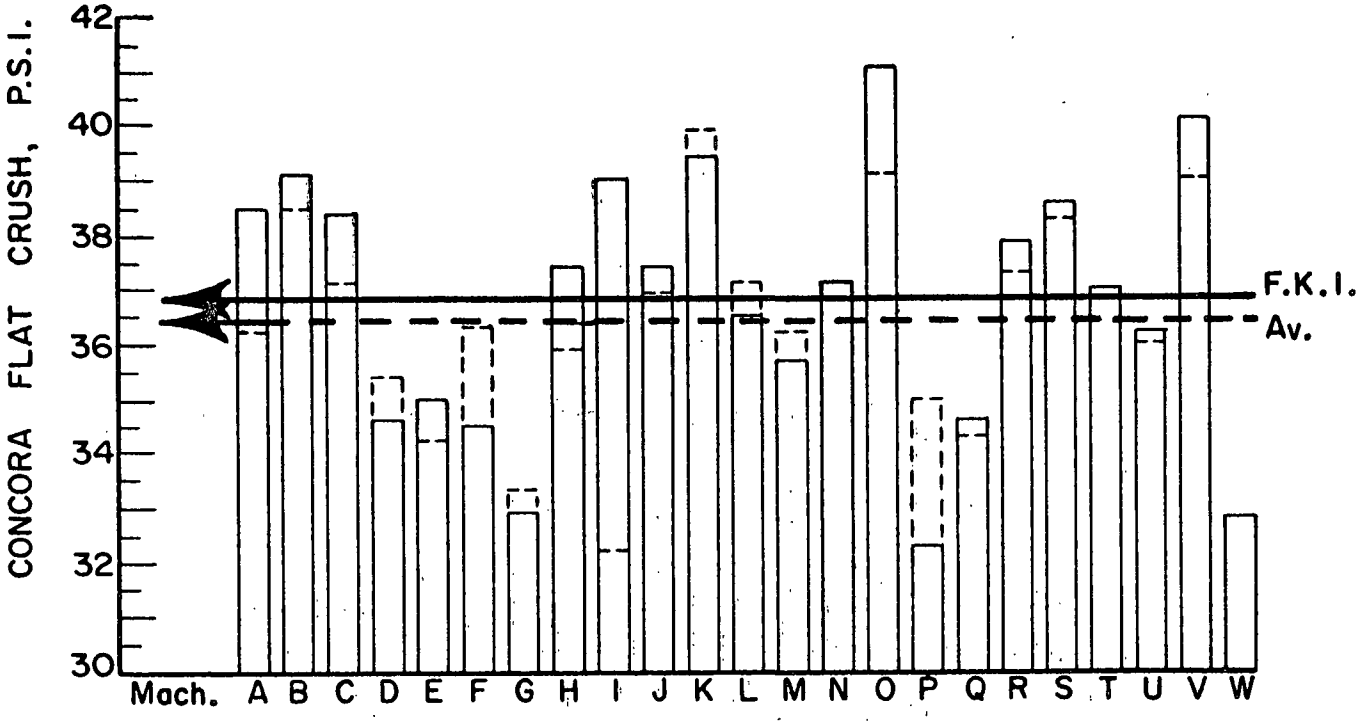

Figure 3. Comparison of Concora Flat Crush Results

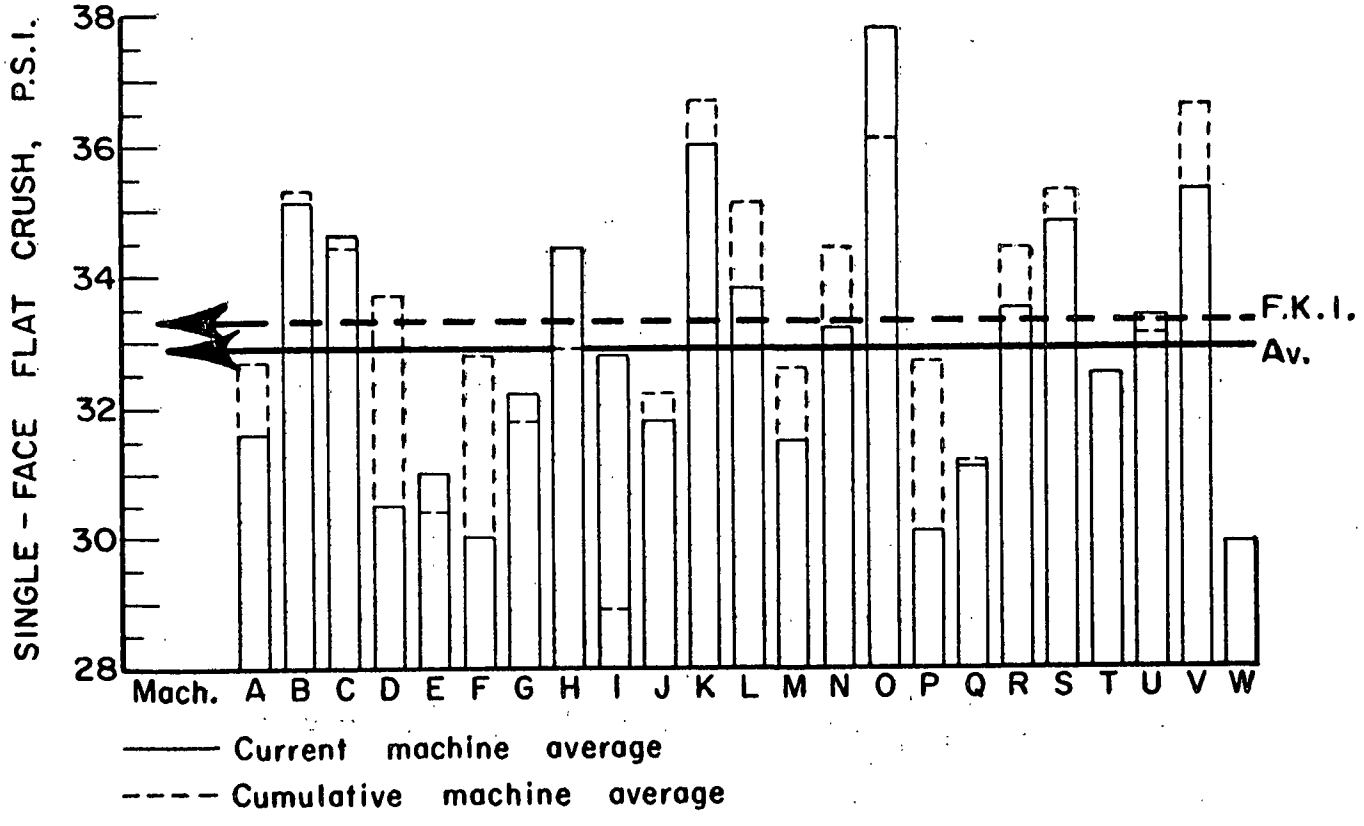

Figure 4. Comparison of Single-Face Flat Crush Results

The test results obtained on the sample lots submitted from the production of individual machines during December, 1961, and January, 1962, are shown in Tables III through XXV for Machines A through W, respectively. The maximum, minimum, and average test results obtained on each sample lot are shown for all tests except basis weight for which only the average is shown; in addition the over-all average result for all sample lots submitted from a given machine is shown for each test. The latter over-all averages are reported as "current machine averages." A cumulative machine average is also shown and is calculated by averaging the current machine average for the previous twelve periods (excluding the current period). Also shown for each machine in Tables III to XXV are the machine factor and machine index which are defined as follows:

$$\frac{\text{current machine average}}{\text{cumulative machine average}} \times 100 = \text{machine factor (\%)}$$

$$\frac{\text{current machine average}}{\text{cumulative F.K.I. average}} \times 100 = \text{machine index (\%)}$$

The machine factor and machine index provide a means for comparing the current machine average with either the previous results for that particular machine or with the cumulative results for all machines--i.e., the cumulative F.K.I. average.

TABLE III

SUMMARY OF TEST RESULTS FOR MACHINE A

December, 1961 and January, 1962

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runnability, maximum tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
A-1	12-6-61	12-26-61	394	29.5	11.3	10.5	10.9	39.0	36.0	37.8	32.2	30.0	31.1	1-1/2
A-2	12-14-61	12-26-61	395	29.0	10.8	10.0	10.3	42.0	36.0	39.2	35.6	30.8	32.1	1-1/2
Current Machine Average				29.3			10.6			38.5			31.6	
Cumulative Machine Average				28.6			10.6			36.2			32.7	
Machine Factor, %				102.4			100.0			106.4			96.7	
Machine Index, %				107.2			103.2			105.9			94.8	

TABLE IV

SUMMARY OF TEST RESULTS FOR MACHINE B

December, 1961 and January, 1962

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runnability, maximum tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
B-1	11-28-61	12-13-61	296	27.1	11.8	10.5	11.2	40.2	37.2	38.4	35.2	33.0	34.2	1-1/2
B-2	12-1-61	12-13-61	297	26.8	10.9	10.2	10.6	41.4	37.2	40.0	36.4	33.6	35.1	1-1/2
B-3	12-11-61	12-20-61	298	26.7	11.1	10.3	10.7	40.2	37.2	39.0	33.2	31.8	32.7	1-1/2
B-4	1-5-62	1-15-62	299	25.7	10.5	10.0	10.2	38.4	36.0	37.6	38.0	36.2	37.1	1-1/2
B-5	1-16-62	1-22-62	300	26.8	11.4	10.3	10.9	43.2	38.4	40.7	37.4	35.6	36.3	1-1/2
Current Machine Average				26.6			10.7			39.1			35.1	
Cumulative Machine Average				26.8			11.0			38.5			35.3	
Machine Factor, %				99.2			97.7			101.7			99.3	
Machine Index, %				97.5			104.4			107.5			105.3	

TABLE V

SUMMARY OF TEST RESULTS FOR MACHINE C

December, 1961 and January, 1962

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runnability, maximum tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
C-1	12-6-61	12-20-61	--	27.5	10.3	10.0	10.2	39.6	36.6	38.2	35.8	33.4	34.8	1-1/2
C-2	12-9-61	12-20-61	--	26.3	10.4	10.0	10.2	40.2	31.8	36.5	31.6	30.0	31.0	1-1/2
C-3	12-12-61	12-20-61	--	25.7	11.0	10.1	10.4	40.2	36.0	37.3	34.6	31.6	32.8	1
C-4	12-15-61	12-26-61	--	27.6	10.0	9.5	9.9	40.8	40.2	40.6	35.6	34.0	35.0	1-1/2
C-5	1-3-62	1-23-62	--	27.4	10.1	9.8	10.0	40.8	36.6	39.1	35.6	34.4	35.0	1-1/2
C-6	1-5-62	1-23-62	--	26.8	10.8	10.0	10.3	39.6	34.8	37.9	36.4	33.6	35.2	1-1/2
C-7	1-9-62	1-23-62	--	27.0	10.9	10.0	10.4	40.2	36.0	37.3	35.4	33.4	34.1	1-1/2
C-8	1-12-62	1-23-62	--	27.6	10.8	10.0	10.2	41.4	39.0	40.4	40.4	37.2	39.2	1-1/2
Current Machine Average				27.0			10.2			38.4			34.6	
Cumulative Machine Average				27.1			10.1			37.1			34.4	
Machine Factor, %				99.7			101.3			103.6			100.8	
Machine Index, %				98.8			99.4			105.6			103.9	

TABLE VI

SUMMARY OF TEST RESULTS FOR MACHINE D

December, 1961 and January, 1962

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runnability, maximum tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
D-1	12-11-61	12-20-61	113	28.5	10.3	8.9	9.6	33.0	30.6	31.7	33.2	30.0	31.6	1-1/2
D-2	12-11-61	12-20-61	114	26.1	10.8	9.2	10.0	36.6	30.6	33.1	29.6	28.0	28.9	1-1/2
D-3	12-12-61	12-20-61	115	25.4	10.1	9.7	9.9	36.6	31.8	34.2	31.8	27.8	29.6	1-1/2
D-4	12-12-61	12-20-61	116	32.5	11.9	11.0	11.4	48.0	37.8	43.0	40.6	36.8	39.0	1
D-5	1-8-62	1-23-62	117	28.4	10.1	9.2	9.8	37.2	33.6	35.6	32.6	31.0	31.6	1-1/2
D-6	1-8-62	1-23-62	118	27.1	10.1	9.5	9.9	36.0	31.8	33.8	29.6	27.0	28.4	1-1/2
D-7	1-9-62	1-23-62	119	27.1	10.1	8.9	9.8	34.8	31.8	33.2	26.2	25.6	25.9	1-1/2
D-8	1-9-62	1-23-62	120	30.1	10.0	9.4	9.8	34.8	30.0	32.2	31.0	28.4	29.2	1-1/2
Current Machine Average				28.2			10.0			34.6			30.5	
Cumulative Machine Average				28.0			9.8			35.4			33.7	
Machine Factor, %				100.4			101.9			97.8			90.7	
Machine Index, %				103.1			97.6			95.1			91.6	

TABLE VII

SUMMARY OF TEST RESULTS FOR MACHINE E

December, 1961 and January, 1962

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runnability, maximum tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
E-1	11-27-61	12-11-61	49	28.8	9.7	9.2	9.5	36.0	34.2	34.8	29.8	28.4	29.4	1-1/2
E-2	11-27-61	12-11-61	50	29.1	9.7	9.2	9.4	34.2	31.8	33.4	31.6	29.8	30.8	1-1/2
E-3	11-27-61	12-13-61	51	29.0	9.8	9.1	9.6	36.0	32.4	34.4	31.0	26.8	29.8	1-1/2
E-4	11-27-61	12-11-61	52	28.4	9.7	9.2	9.4	37.8	31.8	34.7	30.8	28.6	29.6	1-1/2
E-5	1-8-62	1-19-62	1	28.4	10.0	9.0	9.3	39.0	34.2	36.4	34.4	30.6	31.8	1-1/2
E-6	1-8-62	1-19-62	2	28.5	9.9	9.0	9.4	37.2	34.8	36.1	36.2	33.0	34.5	1-1/2
Current Machine Average				28.7			9.4			35.0			31.0	
Cumulative Machine Average				27.8			9.3			34.2			30.4	
Machine Factor, %				103.4			101.0			102.3			102.0	
Machine Index, %				105.1			91.9			96.1			93.0	

TABLE VIII

SUMMARY OF TEST RESULTS FOR MACHINE F

December, 1961 and January, 1962

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runnability, maximum tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
F-1	11-16-61	11-28-61	625	28.5	11.2	10.8	11.0	34.8	30.6	33.2	31.6	30.4	31.2	1-1/2
F-2	11-16-61	11-28-61	626	28.7	11.2	10.9	11.0	34.8	32.4	33.7	32.0	30.4	31.0	1-1/2
F-3	12-2-61	12-12-62	633	28.5	12.5	11.6	12.0	34.2	31.2	32.3	30.0	28.2	29.2	1-1/2
F-4	12-2-61	12-12-62	634	28.4	12.6	11.7	12.0	34.2	32.4	33.2	30.4	28.4	29.5	1-1/2
F-5	12-15-61	12-26-62	641	28.4	12.0	11.7	11.9	36.0	31.8	34.4	29.2	26.8	27.8	1
F-6	12-15-61	12-26-61	642	28.7	12.0	11.1	11.6	37.2	31.8	34.6	28.8	26.4	27.4	1
F-7	1-16-62	1-24-62	649	27.4	11.0	10.4	10.8	39.6	34.2	36.1	32.0	29.2	30.6	1
F-8	1-16-62	1-24-62	650	28.4	10.9	10.3	10.8	39.6	37.2	38.3	33.8	32.8	33.2	1
Current Machine Average				28.4			11.4			34.5			30.0	
Cumulative Machine Average				28.0			10.8			36.3			32.8	
Machine Factor, %				101.4			105.3			94.9			91.5	
Machine Index, %				103.9			111.0			94.8			89.9	

TABLE IX

SUMMARY OF TEST RESULTS FOR MACHINE G

December, 1961 and January, 1962

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runnability, maximum tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
G-1	11-28-61	12-26-61	32	27.4	10.0	9.5	9.9	34.8	32.4	33.8	35.0	32.6	34.1	1
G-2	11-29-61	12-26-61	33	27.0	10.0	9.2	9.8	35.4	33.0	34.2	33.6	32.2	32.9	1-1/2
G-3	11-30-61	12-26-61	34	27.0	10.0	9.5	9.8	36.6	33.6	34.6	33.6	30.2	32.0	1
G-4	12-5-61	1-26-62	35	28.4	10.0	9.2	9.9	34.8	31.8	33.2	36.8	33.8	34.9	1-1/2
G-5	12-6-61	1-26-62	36	27.6	9.9	8.7	9.0	34.2	29.4	31.3	33.6	29.6	30.8	1-1/2
G-6	12-13-61	1-26-62	37	28.1	10.2	9.2	9.8	36.0	30.0	33.0	34.8	32.4	33.4	1
G-7	12-23-61	1-26-62	38	27.6	9.2	8.2	8.8	31.2	30.0	30.6	30.8	28.0	29.7	Min.
G-8	12-30-61	1-26-62	39	27.3	9.8	9.0	9.2	35.4	30.6	33.2	32.0	30.6	31.6	1/2
G-9	12-31-61	1-26-62	40	26.9	10.0	9.1	9.6	34.2	30.6	32.5	31.8	29.4	30.4	1/2
Current Machine Average				27.5			9.5			32.9			32.2	
Cumulative Machine Average				27.4			9.6			33.3			31.8	
Machine Factor, %				100.2			98.9			99.0			101.1	
Machine Index, %				100.7			92.9			90.5			96.6	

TABLE X

SUMMARY OF TEST RESULTS FOR MACHINE H

December, 1961 and January, 1962

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runnability, maximum tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
H-1	10-31-61	11-30-61	5400	27.0	10.4	9.8	10.2	42.6	37.8	39.7	37.2	35.6	36.4	1-1/2
H-2	11- 3-61	11-30-61	507	27.1	10.3	9.7	10.0	39.6	37.8	38.9	37.4	35.6	36.5	1-1/2
H-3	11-22-61	12- 5-61	3651	27.1	10.7	10.2	10.3	40.2	36.6	38.3	39.0	34.4	36.9	1-1/2
H-4	11-27-61	12- 5-61	4716	26.3	10.3	9.8	10.0	38.4	34.8	37.6	34.0	32.6	33.3	1
H-5	11-28-61	12-14-61	4806	26.8	11.1	10.2	10.5	40.2	37.2	39.1	33.4	32.8	33.0	1
H-6	11-28-61	12-14-61	4992	27.1	10.7	10.2	10.4	39.6	35.4	37.2	33.6	31.0	32.4	1-1/2
H-7	11-29-61	12-14-61	5095	26.8	10.2	9.8	10.1	39.6	33.6	35.9	34.6	32.8	33.9	1-1/2
H-8	11-30-61	1 -24-62	5274	27.1	10.8	10.0	10.4	38.4	35.4	37.1	32.4	31.4	31.9	1
H-9	12- 4-61	12-14-61	675	26.5	10.6	9.8	10.2	37.2	36.0	36.6	35.6	33.6	35.0	1-1/2
H-10	12- 5-61	1 -24-62	929	27.3	11.0	10.1	10.5	38.4	34.8	36.1	37.2	35.6	36.3	1
H-11	12-13-61	1 -24-62	2457	26.8	11.0	10.6	10.9	40.8	34.8	37.2	36.0	32.0	33.5	1/2
H-12	12-14-61	1 -24-62	2630	26.8	11.0	10.4	10.7	37.2	33.6	34.8	34.8	32.8	33.7	1-1/2
Current Machine Average				26.9			10.4			37.4			34.4	
Cumulative Machine Average				26.8			10.5			35.9			32.9	
Machine Factor, %				100.2			98.3			104.0			104.5	
Machine Index, %				98.5			100.9			102.7			103.3	

TABLE XI

SUMMARY OF TEST RESULTS FOR MACHINE I

December, 1961 and January, 1962

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runnability, maximum tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
I-1	--	12-20-61	110	28.4	10.4	10.0	10.2	44.4	37.2	41.8	36.2	32.8	35.0	1-1/2
I-2	--	12-20-61	111	28.3	10.7	9.9	10.2	45.0	40.2	41.6	34.8	33.0	34.0	1-1/2
I-3	--	12-20-61	112	28.5	11.0	9.9	10.4	43.2	35.4	39.5	33.0	30.8	32.2	1-1/2
I-4	--	12-20-61	113	28.9	10.7	9.8	10.1	42.6	39.0	40.8	35.0	32.0	33.4	1-1/2
I-5	1-5-62	1-23-62	114	30.6	10.0	8.9	9.8	37.8	33.6	35.4	31.6	29.6	30.6	1-1/2
I-6	1-5-62	1-23-62	115	28.1	10.2	8.9	9.8	39.6	36.0	38.0	34.2	31.4	32.3	1-1/2
I-7	1-5-62	1-23-62	116	30.1	10.0	9.1	9.7	40.8	34.2	37.4	33.2	31.8	32.6	1-1/2
I-8	1-5-62	1-23-62	117	28.3	10.1	9.9	10.0	39.6	36.6	37.8	33.8	31.2	32.6	1-1/2
Current Machine Average				28.9			10.0			39.0			32.8	
Cumulative Machine Average				28.0			10.0			32.2			28.9	
Machine Factor, %				103.3			100.0			121.3			113.7	
Machine Index, %				105.8			97.7			107.3			98.5	

TABLE XII

SUMMARY OF TEST RESULTS FOR MACHINE J

December, 1961 and January, 1962

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runnability, maximum tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
J-1	11-24-61	11-29-61	629	27.7	10.6	10.1	10.3	43.2	36.0	40.7	36.2	32.8	35.0	1-1/2
J-2	11-24-61	11-29-61	630	27.6	10.3	9.6	10.0	43.2	37.2	40.7	35.6	33.8	34.8	1-1/2
J-3	12- 9-61	12-15-61	637	26.9	10.2	9.8	10.1	39.6	33.6	36.8	32.0	28.4	30.8	1-1/2
J-4	12- 9-61	12-15-61	638	25.8	10.8	9.8	10.2	34.8	32.4	33.4	30.8	27.2	28.9	1-1/2
J-5	12-20-61	12-28-61	645	27.4	10.0	9.9	10.0	42.0	33.6	37.0	32.6	30.0	31.8	1-1/2
J-6	12-20-61	12-28-61	646	27.0	10.1	9.7	9.9	43.2	36.0	38.4	32.8	28.2	30.8	1-1/2
J-7	1- 4-62	1-10-62	653	27.4	10.8	10.0	10.1	40.2	33.0	35.8	32.6	28.6	30.6	1-1/2
J-8	1- 4-62	1-10-62	654	27.2	10.2	10.0	10.0	38.4	34.8	36.4	32.6	29.4	31.4	1-1/2
Current Machine Average				27.1			10.1			37.4			31.8	
Cumulative Machine Average				27.4			10.1			36.9			32.2	
Machine Factor, %				99.0			100.0			101.3			98.6	
Machine Index, %				99.3			98.3			102.7			95.3	

TABLE XIII

SUMMARY OF TEST RESULTS FOR MACHINE K

December, 1961 and January, 1962

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runnability, maximum tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
K-1	11-20-61	12-6-61	340	27.0	10.6	10.2	10.4	43.8	39.6	41.6	39.2	38.0	38.5	1-1/2
K-2	11-27-61	12-20-61	341	28.9	11.2	10.7	10.9	43.2	38.4	40.9	37.2	34.6	36.0	1-1/2
K-3	12-4-61	12-20-61	342	28.4	11.1	10.5	10.9	42.6	34.8	39.1	36.2	34.6	35.6	1-1/2
K-4	12-11-61	12-20-61	343	29.0	11.2	10.7	10.9	40.2	37.8	38.9	38.2	35.4	37.2	1-1/2
K-5	12-18-61	1-15-62	344	28.9	11.2	10.5	10.9	42.6	39.6	41.3	39.4	36.6	37.8	1-1/2
K-6	1-3-62	1-22-62	345	27.8	11.5	10.7	11.0	39.6	33.6	37.4	34.0	31.2	32.7	1-1/2
K-7	1-8-62	1-22-62	346	28.3	11.3	10.9	11.0	40.8	34.8	37.6	36.2	32.2	33.8	1-1/2
K-8	1-15-62	1-22-62	347	27.9	11.2	10.5	10.9	40.8	37.2	38.3	37.6	36.2	36.7	1-1/2
Current Machine Average				28.3			10.9			39.4			36.0	
Cumulative Machine Average				27.8			10.9			39.9			36.7	
Machine Factor, %				101.7			100.0			98.7			98.2	
Machine Index, %				103.5			106.0			108.3			108.2	

TABLE XIV

SUMMARY OF TEST RESULTS FOR MACHINE L

December, 1961 and January, 1962

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runnability, maximum tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
L-1	11-6-61	11-30-61	159	26.3	9.9	9.3	9.6	36.6	33.0	34.7	33.6	32.0	32.6	1
L-2	11-13-61	11-30-61	303	27.5	9.6	9.2	9.4	38.4	36.6	37.7	39.2	36.2	37.6	1
L-3	11-22-61	12-5-61	657	27.3	10.2	9.4	9.7	39.0	34.8	36.6	34.6	33.2	34.0	1
L-4	11-27-61	12-5-61	805	26.3	9.4	8.8	9.1	35.4	31.8	33.1	32.0	29.8	30.8	1
L-5	12-3-61	12-15-61	70	26.5	9.2	9.0	9.1	36.6	34.8	35.5	32.4	30.4	31.7	1-1/2
L-6	12-5-61	12-15-61	128	26.5	9.8	9.0	9.3	40.2	33.0	36.1	32.6	30.0	32.9	1-1/2
L-7	12-14-61	1-2-62	407	26.8	9.9	9.0	9.7	41.4	37.8	39.7	36.2	33.2	35.1	1-1/2
L-8	12-19-61	1-2-62	570	26.4	10.0	9.7	9.9	40.2	35.4	38.4	37.0	34.6	35.6	1/2
Current Machine Average				26.7			9.5			36.5			33.8	
Cumulative Machine Average				26.7			9.8			37.1			35.1	
Machine Factor, %				100.0			96.7			98.2			96.1	
Machine Index, %				97.8			92.3			100.3			101.4	

TABLE XV

SUMMARY OF TEST RESULTS FOR MACHINE M

December, 1961 and January, 1962

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runnability, maximum tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
M-1	11-25-61	12-11-61	473	26.7	9.1	8.7	8.8	34.8	31.8	33.4	31.0	29.4	30.3	1-1/2
M-2	11-27-61	12-11-61	474	26.8	9.1	8.3	8.7	36.0	33.6	34.8	31.8	31.0	31.4	1-1/2
M-3	12-1-61	12-15-61	475	27.7	9.3	9.0	9.1	37.2	34.2	35.9	33.4	30.4	32.2	1-1/2
M-4	12-3-61	12-15-61	476	26.8	9.2	8.8	9.0	37.2	33.6	35.5	34.8	31.8	33.4	1-1/2
M-5	12-6-61	1-8-62	477	27.1	9.0	8.2	8.7	40.2	36.6	38.3	34.8	31.8	33.5	1-1/2
M-6	12-10-61	1-8-62	478	26.5	9.8	8.9	9.2	38.4	33.0	35.9	34.4	29.0	32.0	1-1/2
M-7	1-1-62	1-9-62	479	26.2	8.9	8.4	8.8	38.4	35.4	36.7	31.0	28.0	29.7	1-1/2
M-8	1-13-62	1-22-62	480	26.6	9.0	8.8	8.9	36.0	34.2	35.0	30.6	28.2	29.3	1-1/2
Current Machine Average				26.8			8.9			35.7			31.5	
Cumulative Machine Average				26.9			9.4			36.2			32.6	
Machine Factor, %				99.7			94.5			98.7			96.6	
Machine Index, %				98.1			86.8			98.1			94.5	

TABLE XVI

SUMMARY OF TEST RESULTS FOR MACHINE N

December, 1961 and January, 1962

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runnability, maximum tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
N-1	12-6-61	12-20-61	--	28.3	10.7	10.2	10.4	37.8	34.2	36.8	33.6	32.8	33.4	1-1/2
N-2	12-11-61	12-20-61	--	27.9	10.2	10.0	10.1	40.2	37.2	39.0	35.2	33.0	34.0	1-1/2
N-3	12-16-61	12-26-61	--	29.1	10.1	9.7	9.9	40.8	36.0	38.2	34.2	31.6	33.0	1-1/2
N-4	12-17-61	12-26-61	--	27.8	10.1	9.9	10.0	39.0	32.4	35.6	35.0	32.8	33.6	1-1/2
N-5	1-11-62	1-23-62	--	27.4	10.5	10.0	10.2	39.0	35.4	36.8	33.4	30.4	31.7	1-1/2
N-6	1-13-62	1-23-62	--	27.6	10.3	9.9	10.1	38.4	36.0	37.1	36.8	33.4	35.4	1-1/2
N-7	1-17-62	1-23-62	--	26.3	10.5	9.8	10.1	38.4	34.8	36.1	32.4	30.4	31.6	1-1/2
Current Machine Average				27.8			10.1			37.1			33.2	
Cumulative Machine Average				27.5			10.3			37.1			34.4	
Machine Factor, %				101.2			97.9			100.0			96.6	
Machine Index, %				101.7			98.5			102.0			99.8	

TABLE XVII

SUMMARY OF TEST RESULTS FOR MACHINE 0

December, 1961 and January, 1962

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runnability, maximum tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
0-1	11-27-61	12-1-61	652	27.3	11.8	10.8	11.2	41.4	36.0	39.2	38.0	35.4	36.9	1-1/2
0-2	12-11-61	12-20-61	653	26.7	11.8	10.8	11.1	43.2	37.8	41.5	38.0	34.2	36.6	1-1/2
0-3	12-29-61	1-8-62	654	27.4	11.1	9.9	10.8	45.6	40.2	42.6	42.2	38.4	40.0	1-1/2
0-4	1-16-62	1-22-62	655	27.4	11.3	10.5	10.8	44.4	38.4	40.9	38.8	36.6	37.8	1-1/2
Current Machine Average				27.2			11.0			41.1			37.8	
Cumulative Machine Average				26.9			10.8			39.1			36.1	
Machine Factor, %				101.1			101.6			104.9			104.8	
Machine Index, %				99.5			106.9			112.9			113.4	

TABLE XVIII

SUMMARY OF TEST RESULTS FOR MACHINE P

December, 1961 and January, 1962

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runnability, maximum tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
P-1	11-19-61	12-1-61	K-3	27.0	10.4	9.3	9.9	34.8	31.8	32.9	32.0	31.4	31.6	1-1/2
P-2	11-19-61	12-1-61	K-4	27.1	11.0	9.8	10.3	37.8	31.8	34.8	33.8	32.6	33.3	1-1/2
P-3	11-19-61	12-1-61	K-5	27.1	10.8	9.6	10.1	37.2	31.2	34.4	34.0	32.2	33.0	1-1/2
P-4	11-19-61	12-1-61	K-6	27.0	10.6	9.8	10.1	33.0	31.2	32.2	31.4	30.4	30.9	1-1/2
P-5	12-16-61	1-4-62	L-8	26.1	11.0	10.0	10.4	34.2	26.4	30.2	28.4	26.0	27.3	1-1/2
P-6	12-16-61	1-4-62	L-9	26.6	10.9	10.0	10.2	35.4	30.6	32.0	28.6	26.0	27.4	1-1/2
P-7	12-16-61	1-4-62	L-10	26.0	10.0	9.0	9.8	33.6	28.2	30.7	28.4	26.4	27.5	1-1/2
P-8	12-16-61	1-4-62	L-11	26.4	10.0	9.6	9.9	34.8	27.6	30.8	30.6	29.0	29.7	1-1/2
Current Machine Average				26.7			10.1			32.3			30.1	
Cumulative Machine Average				27.2			9.7			35.0			32.7	
Machine Factor, %				98.0			103.9			92.1			92.0	
Machine Index, %				97.7			98.3			88.7			90.3	

TABLE XIX

SUMMARY OF TEST RESULTS FOR MACHINE Q

December, 1961 and January, 1962

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runnability, maximum tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
Q-1	11-10-61	12-15-61	184	27.4	10.9	10.1	10.6	37.2	32.4	35.3	31.8	29.4	31.2	1/2
Q-2	11-18-61	12-15-61	185	26.8	10.6	10.1	10.3	36.0	33.6	34.8	31.6	28.2	30.4	1/2
Q-3	12-1-61	12-15-61	186	26.3	11.0	10.0	10.3	34.8	31.2	33.0	31.2	27.6	29.8	1-1/2
Q-4	12-3-61	12-15-61	187	27.1	11.0	10.4	10.8	34.8	30.0	33.0	33.2	30.4	31.6	1-1/2
Q-5	12-15-61	1-18-62	188	26.8	10.9	10.0	10.4	37.8	34.2	36.1	35.2	32.0	33.5	1-1/2
Q-6	12-18-61	1-18-62	189	26.8	11.0	10.3	10.7	36.0	31.8	33.5	31.6	28.6	30.2	1/2
Q-7	12-23-61	1-18-62	190	27.2	10.9	10.3	10.7	38.4	35.4	36.7	31.8	30.0	31.0	1/2
Q-8	1-3-62	1-18-62	191	26.5	11.0	10.0	10.6	36.6	33.0	34.6	32.6	29.4	31.4	1-1/2
Current Machine Average				26.9			10.5			34.6			31.1	
Cumulative Machine Average				26.7			10.4			34.3			31.2	
Machine Factor, %				100.6			101.2			100.9			99.8	
Machine Index, %				98.4			102.8			95.1			93.4	

TABLE XX

SUMMARY OF TEST RESULTS FOR MACHINE R

December, 1961 and January, 1962

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runnability, maximum tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
R-1	12-5-61	12-20-61	--	26.8	10.3	9.8	10.1	40.2	38.4	39.4	33.6	32.4	33.1	1-1/2
R-2	12-10-61	12-20-61	--	25.9	10.1	9.5	9.9	40.8	34.8	37.9	32.2	29.6	30.5	1-1/2
R-3	12-14-61	12-26-61	--	27.1	10.2	10.0	10.0	42.0	36.6	39.2	34.8	33.2	34.2	1-1/2
R-4	12-18-61	12-26-61	--	26.6	10.2	10.0	10.1	40.8	36.0	38.2	35.2	32.8	34.2	1-1/2
R-5	1-5-62	1-23-62	--	26.3	10.2	9.9	10.0	37.8	33.6	35.6	34.8	32.4	33.6	1-1/2
R-6	1-10-62	1-23-62	--	26.3	10.5	9.9	10.2	38.4	33.6	36.6	35.6	33.4	34.1	1-1/2
R-7	1-16-62	1-23-62	--	27.1	10.5	9.9	10.1	40.2	35.4	37.2	34.6	32.4	33.6	1-1/2
R-8	1-17-62	1-23-62	--	27.2	10.3	10.0	10.1	41.4	37.8	39.0	35.2	34.4	34.8	1-1/2
Current Machine Average				26.7			10.1			37.9			33.5	
Cumulative Machine Average				26.7			10.1			37.3			34.4	
Machine Factor, %				100.0			100.0			101.5			97.5	
Machine Index, %				97.6			98.1			104.1			100.5	

TABLE XXI

SUMMARY OF TEST RESULTS FOR MACHINE S

December, 1961 and January, 1962

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runnability, maximum tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
S-1	11-25-61	12-5-61	478	27.2	10.5	9.8	10.2	39.6	35.4	37.7	34.8	32.2	33.3	1-1/2
S-2	12-6-61	12-15-61	479	27.9	10.3	10.0	10.0	40.2	37.2	38.5	35.6	33.4	34.6	1-1/2
S-3	12-16-61	1-24-62	480	27.2	10.1	9.9	10.0	42.6	37.2	39.6	38.8	35.2	36.5	1-1/2
Current Machine Average				27.4			10.1			38.6			34.8	
Cumulative Machine Average				27.3			10.2			38.3			35.3	
Machine Factor, %				100.6			98.6			100.8			98.7	
Machine Index, %				100.4			98.5			106.1			104.5	

TABLE XXII

SUMMARY OF TEST RESULTS FOR MACHINE T

December, 1961 and January, 1962

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runnability, maximum tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
T-1	1-4-62	1-16-62	1	26.5	10.0	8.9	9.7	38.4	35.4	37.6	33.6	32.2	32.9	1-1/2
T-2	1-9-62	1-16-62	2	26.0	9.0	8.6	8.9	43.2	33.6	38.4	36.0	29.2	32.5	1-1/2
T-3	1-18-62	1-24-62	3	26.8	10.5	9.0	9.8	38.4	32.4	34.9	33.6	30.4	32.0	1-1/2
Current Machine Average				26.4			9.5			37.0			32.5	
Cumulative Machine Average				--			--			--			--	
Machine Factor, %				--			--			--			--	
Machine Index, %				96.8			92.4			101.6			97.4	

TABLE XXIII

SUMMARY OF TEST RESULTS FOR MACHINE U

December, 1961 and January, 1962

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runnability, maximum tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
U-1	1-9-62	1-17-62	651	26.5	11.2	10.1	10.6	39.6	32.4	37.7	37.0	32.8	34.7	1-1/2
U-2	1-9-62	1-17-62	652	26.5	11.9	10.8	11.4	40.2	36.0	38.0	33.2	30.4	32.0	1-1/2
U-3	1-17-62	1-24-62	659	26.5	12.0	10.1	11.0	36.0	32.4	34.6	35.4	32.4	33.5	1-1/2
U-4	1-17-62	1-24-62	660	28.2	11.8	9.8	10.9	38.4	30.6	34.6	34.4	31.6	33.5	1-1/2
Current Machine Average				26.9			11.0			36.2			33.4	
Cumulative Machine Average				26.9			11.2			36.0			33.1	
Machine Factor, %				100.0			98.0			100.7			100.9	
Machine Index, %				98.6			107.0			99.5			100.3	

TABLE XXIV

SUMMARY OF TEST RESULTS FOR MACHINE V

December, 1961 and January, 1962

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runnability, maximum tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
V-1	1-5-62	1-18-62	37	26.8	10.1	9.5	9.8	45.6	38.4	41.3	38.2	34.0	36.2	1-1/2
V-2	1-6-62	1-18-62	38	26.3	10.1	10.0	10.0	40.8	37.2	39.2	34.6	33.2	33.7	1-1/2
V-3	1-7-62	1-18-62	39	27.6	10.9	10.3	10.6	44.4	39.6	41.9	38.6	37.4	38.2	1-1/2
V-4	1-8-62	1-18-62	40	27.4	10.3	10.0	10.1	40.2	37.2	37.9	34.2	32.0	33.1	1-1/2
Current Machine Average				27.0			10.1			40.1			35.3	
Cumulative Machine Average				27.0			10.1			39.0			36.6	
Machine Factor, %				100.0			100.0			102.7			96.3	
Machine Index, %				98.9			98.9			110.1			105.9	

TABLE XXV

SUMMARY OF TEST RESULTS FOR MACHINE W

December, 1961 and January, 1962

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb. per 1000 sq. ft.	Caliper, points			Concora Flat Crush, p.s.i.			Single-Face Flat Crush, p.s.i.			Runnability, maximum tension at 600 f.p.m., lb./in.
					Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.	
W-1	1-4-62	1-16-62	1	25.4	10.1	9.9	10.0	34.2	30.6	32.5	29.8	29.0	29.5	1-1/2
W-2	1-9-62	1-16-62	2	26.3	10.1	9.0	9.7	36.0	31.8	34.1	33.4	30.8	32.0	1-1/2
W-3	1-18-62	1-24-62	3	26.0	10.9	9.9	10.2	34.2	29.4	31.9	29.4	27.4	28.2	1-1/2
Current Machine Average				25.9			10.0			32.8			29.9	
Cumulative Machine Average				--			--			--			--	
Machine Factor, %				--			--			--			--	
Machine Index, %				94.9			97.2			90.3			89.7	

DISCUSSION OF RESULTS

Shown below from Table II are the maximum and minimum current machine averages noted for each test during the current period (December, 1961, and January, 1962); the current machine average is the average of the results obtained on all rolls submitted from a given machine during the current period. Also given for each test is the current F.K.I. average which is determined by averaging the current machine averages for a given period and is indicative of the test level being maintained by the industry as a whole to the extent that the industry is represented by the participating machines:

	Maximum Current Machine Average	Minimum Current Machine Average	Current F.K.I. Average
Basis wt., lb.	29.3	25.9	27.4
Caliper, pt.	11.4	8.9	10.2
Concora flat crush, p.s.i.	41.1	32.3	36.8
Single-face flat crush, p.s.i.	37.8	29.9	32.9

The runnability data for the 150 rolls evaluated during December, 1961, and January, 1962, are summarized as follows:

Runnability	Number of Rolls	Percentage of Total Rolls
Less than 600 f.p.m. with minimum tension	0	0.0
600 f.p.m.--minimum tension	1	0.7
600 f.p.m.--1/2 lb. per in. tension	8	5.3
600 f.p.m.--1 lb. per in. tension	17	11.3
600 f.p.m.--1-1/2 lb. per in. tension	124	82.7

In Table XXVI a comparison of Institute and mill Concora flat crush test results obtained on conditioned specimens is given for each machine for the current period. These comparisons permit interested participants to submit their Concora flat crush test results to The Institute of Paper Chemistry so that comparative results may be included in the monthly reports. Data sheets for supplying this information may be obtained from the Institute. Comparisons of this kind are a helpful adjunct to other calibration procedures. Shown in Table XXVI are the Institute and mill Concora averages for each roll included in these comparisons, the difference between the roll average based on Institute data and that based on mill data, the Institute and mill averages based on all rolls included in the comparison, and the difference between these over-all averages.

The Concora flat crush data shown in Table XXVI are summarized in Part I of Table XXVII where for each machine the following information is given: (1) Current machine average based on Institute data, (2) current machine average based on mill data, (3) the average difference--that is, the difference between the current machine average based on Institute data and that based on mill data and (4) the maximum difference encountered in comparing Institute and mill test averages for individual rolls. In Part II of Table XXVII the average differences given in Part I have been converted to per cent. Comparative data from the previous bimonthly report are also included in Part II of Table XXVII. It may be seen in Part II of Table XXVII that, for the current period, the highest average difference of 8.3% was associated with Machine E and the lowest of 0.5% with Machines C and R.

In Table XXVIII a comparison of the agreement between Institute and mill Concora flat crush data is given for the current period. Comparative data for the months of October and November, 1961, are also included. The data shown for the

TABLE XXVI

INSTITUTE AND MILL CONCORA FLAT CRUSH TEST RESULTS ON INDIVIDUAL ROLLS FOR DECEMBER, 1961 AND JANUARY, 1962

Machine B						Machine C						Machine D					
			Concora Flat Crush, p.s.i.						Concora Flat Crush, p.s.i.						Concora Flat Crush, p.s.i.		
Code	Mill Roll No.	Date Made	Institute	Mill	Difference[a]	Code	Mill Roll No.	Date Made	Institute	Mill	Difference[a]	Code	Mill Roll No.	Date Made	Institute	Mill	Difference[a]
B-1	296	11-28-61	38.4	40.8	+2.4	C-1	--	12- 5-61	38.2	37.4	-0.8	D-5	117	1- 8-62	35.6	35.6	0.0
B-2	297	12- 1-61	40.0	40.9	+0.9	C-2	--	12-9 -61	36.5	36.2	-0.3	D-6	118	1- 8-62	33.8	35.2	+1.4
B-3	298	12-11-61	39.0	39.6	+0.6	C-3	--	12-12-61	37.3	37.2	-0.1	D-7	119	1- 9-62	33.2	35.5	+2.3
B-4	299	1- 5-62	37.6	40.8	+3.2	C-4	--	12-15-61	40.6	40.0	-0.6	D-8	120	1- 9-62	32.2	35.2	+3.0
B-5	300	1-16-62	40.7	40.0	-0.7	C-5	--	1- 3-62	39.1	37.7	-1.4						
						C-6	--	1- 5-62	37.9	37.0	-0.9						
						C-7	--	1- 9-62	37.3	38.9	+1.6						
						C-8	--	1-12-62	40.4	40.8	+0.4						
Current Machine Av.			39.1	40.4	+1.3	Current Machine Av.			38.4	38.2	-0.2	Current Machine Av.			33.7	35.4	+1.7

Machine E						Machine F						Machine G					
E-1	49	11-27-61	34.8	32.5	-2.3	F-1	625	11-16-61	33.2	32.4	-0.8	G-1	32	11-28-61	33.8	32.9	-0.9
E-2	50	11-27-61	33.4	32.0	-1.4	F-2	626	11-16-61	33.7	32.6	-1.1	G-2	33	11-29-61	34.2	32.2	-2.0
E-3	51	11-27-61	34.4	30.5	-3.9	F-3	633	12- 2-61	32.3	32.2	-0.1	G-3	34	11-30-61	34.6	34.9	+0.3
E-4	52	11-27-61	34.7	31.4	-3.3	F-4	634	12- 2-61	33.2	33.4	+0.2	G-4	35	12- 5-61	33.2	33.4	+0.2
E-5	1	1- 8-62	36.4	32.8	-3.6	F-5	641	12-15-61	34.4	32.4	-2.0	G-5	36	12- 6-61	31.3	31.8	+0.5
E-6	2	1- 8-62	36.1	33.2	-2.9	F-6	642	12-15-61	34.6	34.7	+0.1	G-6	37	12-13-61	33.0	35.4	+2.4
						F-7	649	1-16-62	36.1	36.0	-0.1	G-7	38	12-23-61	30.6	31.3	+0.7
						F-8	650	1-16-62	38.3	36.2	-2.1	G-8	39	12-30-61	33.2	33.6	+0.4
												G-9	40	12-31-61	32.5	34.9	+2.4
Current Machine Av.			35.0	32.1	-2.9	Current Machine Av.			34.5	33.7	-0.8	Current Machine Av.			32.9	33.4	+0.5

Machine H						Machine I						Machine J					
H-1	5400	10-31-61	39.7	35.9	-3.8	I-5	114	1- 5-62	35.4	36.7	+1.3	J-1	629	11-24-61	40.7	40.9	+0.2
H-2	507	11- 3-61	38.9	35.2	-3.7	I-6	115	1- 5-62	38.0	34.6	-3.4	J-2	630	11-24-61	40.7	46.1	+5.4
H-3	3651	11-22-61	38.3	35.2	-3.1	I-7	116	1- 5-62	37.4	36.9	-0.5	J-3	637	12- 9-61	36.8	39.2	+2.4
H-4	4716	11-27-61	37.6	34.2	-3.4	I-8	117	1- 5-62	37.8	34.5	-3.3	J-4	638	12- 9-61	33.4	36.9	+3.5
H-5	4806	11-28-61	39.1	36.6	-2.5							J-5	645	12-20-61	37.0	39.2	+2.2
H-6	4992	11-28-61	37.2	34.4	-2.8							J-6	646	12-20-61	38.4	38.1	-0.3
H-7	5095	11-29-61	35.9	34.8	-1.1							J-7	653	1- 4-62	35.8	38.1	+2.3
H-8	5274	11-30-61	37.1	35.3	-1.8							J-8	654	1- 4-62	36.4	35.4	-1.0
H-9	675	12- 4-61	36.6	36.2	-0.4												
H-10	929	12- 5-61	36.1	34.7	-1.4												
H-11	2457	12-13-61	37.2	34.6	-2.6												
H-12	2630	12-14-61	34.8	35.3	+0.5												
Current Machine Av.			37.4	35.2	-2.2	Current Machine Av.			37.2	35.7	-1.5	Current Machine Av.			37.4	39.2	+1.8

[a]This difference is the amount in p.s.i. units by which the mill result is higher or lower than the Institute result.

TABLE XXVI (Continued)

INSTITUTE AND MILL CONCORA FLAT CRUSH TEST RESULTS ON INDIVIDUAL ROLLS FOR DECEMBER, 1961 AND JANUARY, 1962

Machine K						Machine L						Machine M					
			Concora Flat Crush, p.s.i.						Concora Flat Crush, p.s.i.						Concora Flat Crush, p.s.i.		
Code	Mill Roll No.	Date Made	Institute	Mill	Difference[a]	Code	Mill Roll No.	Date Made	Institute	Mill	Difference[a]	Code	Mill Roll No.	Date Made	Institute	Mill	Difference[a]
						L-1	159	11- 6-61	34.7	38.9	+4.2	M-1	473	11-25-61	33.4	38.3	+4.9
K-2	341	11-27-61	40.9	40.8	-0.1	L-2	303	11-13-61	37.7	37.7	0.0	M-2	474	11-27-61	34.8	36.4	+1.6
K-3	342	12- 4-61	39.1	40.2	+1.1	L-3	657	11-22-61	36.6	39.0	+2.4	M-3	475	12- 1-61	35.9	39.6	+3.7
K-4	343	12-11-61	38.9	40.4	+1.5	L-4	805	11-27-61	33.1	35.5	+2.4	M-4	476	12- 3-61	35.5	39.5	+4.0
K-5	344	12-18-61	41.3	40.7	-0.6	L-5	70	12- 3-61	35.5	38.9	+3.4	M-5	477	12- 6-61	38.3	39.3	+1.0
K-6	345	1- 3-62	37.4	34.8	-2.6	L-6	128	12- 5-61	36.1	36.5	+0.4	M-6	478	12-10-61	35.9	37.2	+1.3
K-7	346	1- 8-62	37.6	37.0	-0.6	L-7	407	12-14-61	39.7	40.7	+1.0	M-7	479	1- 1-62	36.7	39.6	+2.9
K-8	347	1-15-62	38.3	36.4	-1.9	L-8	570	12-19-61	38.4	39.8	+1.4	M-8	480	1-13-62	35.0	36.5	+1.5
Current Machine Av.			39.1	38.6	-0.5	Current Machine Av.			36.5	38.4	+1.9	Current Machine Av.			35.7	38.3	+2.6

Machine N						Machine O						Machine Q					
N-1	--	12- 6-61	36.8	35.4	-1.4	0-1	652	11-27-61	39.2	40.4	+1.2	Q-1	184	11-10-61	35.3	36.7	+1.4
N-2	--	12-11-61	39.0	36.5	-2.5	0-2	653	12-11-61	41.5	42.6	+1.1	Q-2	185	11-18-61	34.8	35.8	+1.0
N-3	--	12-16-61	38.2	36.0	-2.2	0-3	654	12-29-61	42.6	43.6	+1.0	Q-3	186	12- 1-61	33.0	34.7	+1.7
N-4	--	12-17-61	35.6	37.0	+1.4	0-4	655	1-16-62	40.9	41.0	+0.1	Q-4	187	12- 3-61	33.0	34.8	+1.8
N-5	--	1-11-62	36.8	36.2	-0.6							Q-5	188	12-15-61	36.1	36.8	+0.7
N-6	--	1-13-62	37.1	37.2	+0.1							Q-6	189	12-18-61	33.5	36.2	+2.7
N-7	--	1-17-62	36.1	36.8	+0.7							Q-7	190	12-23-61	36.7	33.7	-3.0
Current Machine Av.			37.1	36.4	-0.7	Current Machine Av.			41.1	41.9	+0.8	Current Machine Av.			34.6	35.5	+0.9

Machine R						Machine S						Machine T					
R-1	--	12- 5-61	39.4	39.1	-0.3	S-1	478	11-25-61	37.7	39.1	+1.4	T-1	1	1- 4-62	37.6	37.3	-0.3
R-2	--	12-10-61	37.9	36.5	-1.4	S-2	479	12- 6-61	38.5	39.5	+1.0	T-2	2	1- 9-62	38.4	36.6	-1.8
R-3	--	12-14-61	39.2	40.1	+0.9	S-3	480	12-16-61	39.6	39.5	-0.1	T-3	3	1-18-62	34.9	38.0	+3.1
R-4	--	12-18-61	38.2	38.3	+0.1												
R-5	--	1- 5-62	35.6	36.0	+0.4												
R-6	--	1-10-62	36.6	36.6	0.0												
R-7	--	1-16-62	37.2	37.2	0.0												
R-8	--	1-17-62	39.0	41.2	+2.2												
Current Machine Av.			37.9	38.1	+0.2	Current Machine Av.			38.6	39.4	+0.8	Current Machine Av.			37.0	37.3	+0.3

Machine U						Machine W					
U-1	651	1- 9-62	37.7	34.6	-3.1	W-1	1	1- 4-62	32.5	33.1	+0.6
U-2	652	1- 9-62	38.0	37.0	-1.0	W-2	2	1- 9-62	34.1	36.6	+2.5
U-3	659	1-17-62	34.6	34.9	+0.3	W-3	3	1-18-62	31.9	34.1	+2.2
U-4	660	1-17-62	34.6	37.3	+2.7						
Current Machine Av.			36.2	36.0	-0.2	Current Machine Av.			32.8	34.6	+1.8

[a]This difference is the amount in p.s.i. units by which the mill result is higher or lower than the Institute result.

TABLE XXVII

PART I: A COMPARATIVE SUMMARY FOR EACH MACHINE OF THE CONCORA FLAT CRUSH AVERAGES BASED ON INSTITUTE DATA AND THOSE BASED ON MILL DATA

Machine Code	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
Number of Rolls Compared	0	5	8	4	6	8	9	12	4	8	7	8	8	7	4	0	7	8	3	3	4	0	3
Concora Flat Crush, p.s.i.																							
Current Machine Av. (Institute)[a]	--	39.1	38.4	33.7	35.0	34.5	32.9	37.4	37.2	37.4	39.1	36.5	35.7	37.1	41.1	--	34.6	37.9	38.6	37.0	36.2	--	32.8
Current Machine Av. (Mill)[a]	--	40.4	38.2	35.4	32.1	33.7	33.4	35.2	35.7	39.2	38.6	38.4	38.3	36.4	41.9	--	35.5	38.1	39.4	37.3	36.0	--	34.6
Average Difference[b]	--	+1.3	-0.2	+1.7	-2.9	-0.8	+0.5	-2.2	-1.5	+1.8	-0.5	+1.9	+2.6	-0.7	+0.8	--	+0.9	+0.2	+0.8	+0.3	-0.2	--	+1.8
Maximum Difference[c]	--	+3.2	+1.6	+3.0	-3.9	-2.1	+2.4	-3.8	-3.4	+5.4	-2.6	+4.2	+4.9	-2.5	+1.2	--	-3.0	+2.2	+1.4	+3.1	-3.1	--	+2.5

PART II: A TABULATION FOR EACH MACHINE OF THE AVERAGE DIFFERENCE (PER CENT) BETWEEN THE CONCORA FLAT CRUSH BASED ON INSTITUTE DATA AND THAT BASED ON MILL DATA

Average Difference, %[d]																							
Current Report (Dec. and Jan.)	--	+3.3	-0.5	+5.0	-8.3	-2.3	+1.5	-5.9	-4.0	+4.8	-1.3	+5.2	+7.3	-1.9	+1.9	--	+2.6	+0.5	+2.1	+0.8	-0.6	--	+5.5
92nd Report (Nov.)	--	+1.8	--	--	+4.3	-6.8	--	-1.7	--	-0.5	--	+11.3	+8.0	--	+2.8	--	+3.9	--	+4.5	--	+12.6	--	--
92nd Report (Oct.)	--	--	+8.7	--	-2.3	-2.2	+5.0	+8.0	--	+7.3	--	+11.6	+6.7	+7.6	+1.7	--	+10.8	+8.5	+1.3	--	+10.3	--	--

[a] Comparisons based on current machine average include only those rolls for which mill data were submitted.

[b] Average difference is the difference between the current machine average based on Institute test results and that based on mill test results with the Institute test results used as the reference. See Table XXVI.

[c] Maximum difference is the greatest difference encountered in comparing Institute and mill test averages for individual rolls. See Table XXVI.

[d] Average difference (per cent) is computed by dividing the average difference in p.s.i. (shown above in Part I of this table) by the Institute current machine average and multiplying the result by 100.

current period indicate that a substantial improvement in agreement between Institute and mill **Concora** data is evident over that shown for the months of October and November. Some of the factors that may have contributed toward the relatively poor agreement between Institute and mill Concora data in October and November were discussed in the previous report.

TABLE XXVIII

COMPARISON BY PERIODS OF AGREEMENT BETWEEN INSTITUTE AND MILL CONCORA FLAT CRUSH DATA

Average Percentage Difference Between Institute and Mill Concora Flat Crush Test Results[a]	Percentage of All Machines Included Within the Indicated Range		
	October	November	Current Period[b]
± 1.0	0.0	8.3	20.0
± 2.5	26.7	25.0	50.0
± 5.0	33.3	58.3	75.0
±10.0	80.0	83.3	100.0[d]
±12.6	100.0[c]	100.0	

[a] The average obtained at the Institute was used as the reference in the calculation of the percentage differences.
[b] December, 1961, and January, 1962.
[c] Maximum percentage difference was 11.6.
[d] Maximum percentage difference was 8.3.

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